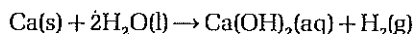


9.3 Reactions of magnesium and calcium with water

Magnesium reacts slowly with water at room temperature forming its hydroxide and hydrogen.

Calcium reacts rapidly with water at room temperature forming calcium hydroxide and hydrogen.



Aim

To investigate the reaction of calcium and magnesium with water.

Apparatus and materials

2 beakers, 100 cm³
3 test-tubes
Filter paper
Filter funnel
Spatula
Drinking straw
pH chart
Emery paper
Splints
Universal Indicator solution
Magnesium ribbon, 3 cm
Calcium turnings

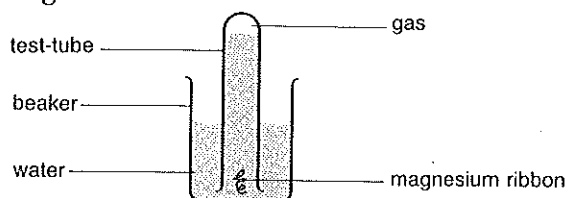
Precaution

A large amount of heat is produced when calcium reacts with water. Calcium should not come into contact with the skin.

Procedure

a) Magnesium

- 1 Clean a piece of magnesium ribbon by pulling it through emery paper.
- 2 Coil the ribbon tightly.
- 3 Half fill a beaker with water. Drop the magnesium ribbon to the bottom of the beaker.
- 4 Fill a test-tube to the brim with water. Lower the open end of the test-tube below the surface of the water and place it over the magnesium.



- 5 Label the apparatus and leave it for about a week.
- 6 After a week estimate the volume of gas in the test-tube.
- 7 Use a spatula to remove the magnesium from the beaker. Examine the surface of the magnesium.
- 8 Add 10 drops of Universal Indicator solution to the water in the beaker.
- 9 Use the pH chart to determine the pH of the water.

b) Calcium

- 1 Repeat steps 3 and 4 using calcium instead of magnesium.
- 2 Collect a test-tube full of hydrogen gas.
- 3 Test the hydrogen with a lighted splint.
- 4 Add some of the solution in the beaker to a test-tube. Add three drops of Universal Indicator solution. With the aid of a pH chart determine and record the pH of the solution.
- 5 Filter some of the solution from the beaker into a test-tube.
- 6 Blow through a straw into the solution in the test-tube.

Results

Copy and complete the following table:

metal	description of reaction with water	colour of solution with Universal Indicator
magnesium		
calcium		

Estimated volume of hydrogen produced by magnesium cm³.

Questions

- a) Name the solid left on the filter paper.
- b) What is another name given to a solution of calcium hydroxide in water?
- c) What is the purpose of blowing through the straw into the solution after the reaction between calcium and water?
- d) Why is the reaction of magnesium with water less exothermic than the reaction of calcium with water?
- e) How would you measure the volumes of gas given off in both reactions?